

REMARKS/ARGUMENTS

In response to the Examiner's objections under 35 U.S.C. 112, and in keeping with the Examiner's remarks the following revisions to the text of the specification as given above have been made, specifically at page 5 (lines 12 through 16), page 6 (lines 24 and 25), page 7 (lines 10 through 22) and page 9 (lines 19 through 21). The claims have been revised to more clearly define the invention.

Claim rejections under U.S.C. 102 & 103, claims 1 to 7 on file have been cancelled and replaced by new claims 8 to 19 to more clearly distinguish the claims over the cited prior art.

In the present invention the feature of the saw blade for cutting steel-reinforced structure is to cut work material such as concrete, blocks or pipes and to easily discharge the cut chips therefrom without deforming its shape, even though it operates for a long time. As shown in Figures 1 to 4, the saw blade comprises a steel disk 10 on both sides of which particulate bearing layer 20 attached and cutting segments 12 attached onto the periphery of the steel disk at predetermined intervals. Here, the steel disk 10 further comprises an opening 11 at the center for connection with a shaft of a motor-driven tool and a plurality of slits between the cutting segments 12 at the periphery thereof.

The particulate bearing layer 20 is made of one or more particle materials selected from the group consisting of diamond, CBN, Al_2O_3 , Zr_2O_3 , ZrO_2 , WC or SiC or made of their mixtures. The shape of the particulate bearing layer 20 forms ring portions 21 with a fixed width and positioned in the central area on both side surfaces of the steel disk 10, and a plurality of streamlined wings 22 extending from the ring portions 21 to the periphery of the steel disk 10 as shown in Figure 1.

Also, the wings on both side surfaces of the disk 10 are arranged so that they are overlapped in full as shown in Figure 1 or at a half as shown in Figure 3 when the wings on both sides are projected to a plane.

In other embodiments as shown in Figures 2 and 4, the saw blade have number of through holes 22H on the particulate bearing layer 20. Here, the number

of the through hole depends on the radius of steel disk of the saw blade and the diameter of through hole 22H increases according as the area of the streamlined wings increases. The through holes are formed on the wings which are overlapped in full or at a half with regard to both side surfaces of the steel disk. This aspect of the present invention is neither disclosed or taught in the cited prior art.

The through holes formed on the steel disk give some additional effects to the saw blades. That is, the friction areas of steel disk of the saw blade are relatively reduced as much as corresponding through hole areas of the whole steel disk area so as to reduce generation of friction heat. Therefore, the saw blades have cooling effects by effectively discharging the friction heat. Also, they can reduce the vibration of the segments on the periphery of the steel disk as offsetting the vibrations between the segments and work materials.

Therefore, the saw blades according to the present invention can cut work materials without deforming their shape even though they operate for a long time.

Also, the saw blades according to the present invention can adapt a turbo-type segments on its steel disk as shown in Figure 5. Thus, the saw blade can effectively cut work materials.

It is contended that the feature of a diamond tip disk saw blade according to Ji (U.S. Patent No. 6,277,017) is to rapidly and precisely cut or grind a work material with reduced vibration and to be easily correct the deformation of the disk saw after it has been deformed and heat treated, so that it could achieve high quality work and enhance durability. For this, as shown in Figure 2, the diamond tip disk saw of Ji, comprises a metal disk 10, a shaft hole 11 of the metal disk 10, a plurality of diamond tips 12 on the periphery of the metal disk 10, a plurality of reinforcing tips 24 disposed on the radially inner part of the plurality of diamond tips 12, intermediate section 13 between the shaft hole 11 and the plurality of diamond tips 12 or the plurality of reinforcing tips 24, a plurality of corrugations 22 extending radially and forming substantially like a sinusoidal wave form on at least one side surface of the metal disk or the other side surface in the intermediate section 13, and a correction section 26 between the plurality of corrugations 22 and the plurality of diamond tips 12 in which correction section 26 does not contain any corrugations.

As shown in Figure 3, the corrugations 22 are curved and radially extended but they are apart from the diamond tips 12, the sinusoidal wave form of the corrugations 22 is formed as the corrugation shaped like a smooth convex arc 25 is

connected with each other. Therefore, the cross sectional view of the corrugations 22 shapes like a sinusoidal form all over their region on the saw disk. When the smooth convex arcs 25 are connected with each other, there are the indentation slots 35 therebetween.

These corrugations 22 may enhance the rigidity of the metal disk 10 and cause rapid air flow between the metal disk 10 so that the heat or chips generated in operation should be rapidly exhausted.

However, the other region except for that of the corrugations 22 is flat. Especially, because the correction section 26 is flat, it is easy to correct the deformation detected during the rest rotation after it is formed and heat-treatment.

Even though the Examiner indicates that all the elements of claim 1 of the present invention are in Ji Patent, Ji does not disclose the particulate bearing layers and the streamlined wings in the present invention. Also, Ji does not include the through holes and a turbo-type segments according to the present invention.

It is submitted that the Examiner indicated that the corrugations disclosed in Ji Patent is the same that as the streamlined wings of the present invention, the shape of the corrugations is quite different from the streamlined wings of the present invention. Further, the corrugations are just formed like a smooth convex arc with respect to the plane of the saw disk and never include any layers made of abrasive materials such as diamond, CBN, Al_2O_3 , Zr_2O_3 , ZrO_2 , WC or SiC or made of their mixture among them like the present invention.

It is further contended that the saw blade of the present invention does not include any indentation slots between the corrugations and reinforcing tips which functions slightly different from that of the diamond tips disclosed in Ji.

Therefore, the features of the saw blade according to the present invention are quite distinct and different from those of Ji Patent (U.S. Pat. No. 6,277,017).

The features of the method and saw blade according to Schweickhardt Patent (U.S. Pat. No. 5,115,796) is to cut concrete or masonry materials without the use of a coolant liquid. In order to achieve the object, as shown in Figures 1, 2, and 5, the saw blade 1 of Schweickhardt comprises a substrate plate 3 made of a steel, a diamond abrasive matrix rim 7 on the perimeter of the substrate plate 3 and an abrasive coating 9 coated on least one face of the substrate plate 3.

Here, the substrate plate 3 forms an arbor hole 5 to fix and arbor shaft at the center, a plurality of pin holes 6 to fix the arbor shaft and preferably a plurality of

apertures (securement holes) 19.

The abrasive coating 9 comprises a binder 11 having suitable abrasive particles 13 embedded therein and fixedly held in place by the binder, and a glass fiber reinforcing mat 15 which is impregnated with a suitable synthetic resin material 17 composed in the binder 11. The glass fiber reinforcing mat 15 greatly strengthens abrasive coating 9 and aids in holding the abrasive particles 13 in the binder 11.

When the saw blade 1 according to Schweickhardt is manufactured, the flat surface of the saw blade is entirely coated with the abrasive 9.

Accordingly, the structure of saw blade of Schweickhardt is quite different from that of the present invention.

Even though the Examiner indicated that Schweickhardt discloses the through holes corresponding to the present invention, three kinds of holes in Schweickhardt patent, the plurality of apertures 19, the plurality of pin holes 6 and the arbor hole 5, are different from those of the present invention. Of course, the arbor hole 5 of Schweickhardt corresponds to the opening 11 of the present invention. But the present invention does not disclose any pin holes correspond to the pin holes 6 of Schweickhardt. Especially, the apertures of Schwickhardt differ from the through holes 22H disclosed in the present invention.

First of all, the apertures 19 are substantially filled with abrasive coating 9 and more particularly with the binder 11 and abrasive particles 13 for at least in part mechanically interlocking coating 9 to its respective one face of substrate plate 3, which is quite different from the through holes 22H of the present invention. That is, the through holes 22H are formed on the streamlined wings $22r_1$ and $22r_2$ of the particulate bearing layers 22 and are never filled with any materials. Also, the through holes 22H give the saw blade of the present invention a cooling effect. But the apertures 19 do interlock the abrasive coating 9 on the face of the substrate plate 3.

Therefore, the features of the saw blade according to the present invention are quite different from those of Schweickhardt Patent (U.S. Pat. No. 5,115,796).

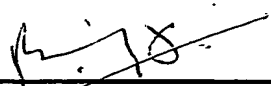
It is therefore, requested that the present claimed invention as in claims 8 to 19 be considered allowable.

Any additional fees that may be required should be deducted from our Deposit Account No. 50-1092.

Respectfully submitted

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,177	12/05/2000	Chang Hyun Lee	SO-405	8039

7590 02/13/2002

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EXAMINER

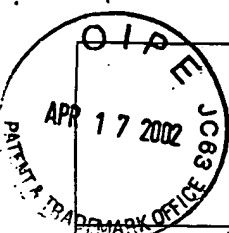
GRANT, ALVIN J

ART UNIT	PAPER NUMBER
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3723

DATE MAILED: 02/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.



Office Action Summary

Application No.

09/730,177

Applicant(s)

LEE ET AL.

Examiner

Alvin J Grant

Art Unit

3723

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 through 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

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DETAILED ACTION

Specification

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are:

- Page 5, lines 12 through 16. "The above object is also achieved according to the third aspect of the invention by a saw blade, wherein the shape and basic arranging principle of wings are the same as in the foregoing two, particularly first aspect, except that.....".
- Page 6, lines 24 and 25. "And the particulate bearing layer is composed of a continuous ring 21 having a fixed width and being located".
- Page 7, lines 19 through 22. "As is clear, wings having the same shape and size are arranged uniformly over the circumferential surface between the inner ring 21 and the outer periphery of the steel disc 10.".
- Page 9, lines 19 through 21. "As the result of tests, the sandwich-type saw blade showed minor wobbling phenomena and the ordinary steel saw blade showed intense wobbling phenomena.".

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract was found to be lengthy and consists of more than one paragraph.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

Referring to claim 1 and 2 the use of parentheses as in the case of "front" and "back" renders the claim indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claims 1, 2, 3, 5 and 6 are rejected under 35 U.S.C. 102(a) as being anticipated by Ji U.S. Patent No. '017.B1.

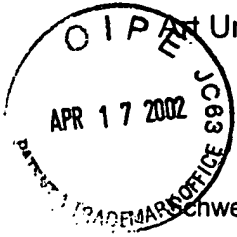
Ji discloses a diamond tip disc saw blade (see figure: 2) comprising: a steel circular disc (10); an opening at the center (11); diamond particled cutting segments (12) attached at predetermined intervals along the periphery of the disc; the particulate bearing layer comprising circular rings of fixed widths; a plurality of streamlined wings (3) located on both sides of the blade at predetermined intervals; and the wing on one side is overlapped with those on the other side (as explained in lines 27-30 of section 1); the wings have different centers of curvature and different radii of curvature so that they become wider as the distance from the ring to the periphery changes; and the wings contain through holes.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ji in view of Schweickhardt U.S. Patent No. '796.

Ji is described above. Ji does not disclose a saw blade with a circular disc containing slits at predetermined intervals around the periphery, nor did he disclose a number of through holes located on the disc, but Schweickhardt does. Furthermore it would have been obvious to one of ordinary skill in the art at the time the invention was made modify the invention of Ji to include slits and additional holes to improve the cutting ability and heat dissipation of the blade as taught by Schweickhardt. Schweickhardt further teaches that the shapes of the holes is a matter of choice.

Conclusion

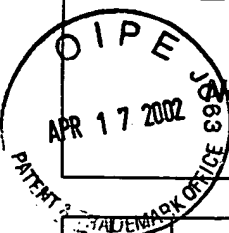
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alvin J Grant whose telephone number is (703) 305-3315. The examiner can normally be reached on Mon.-Fri 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on (703) 308-2687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3579 for regular communications and (703) 305-3588 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1184.

ajg
February 11, 2002

Timothy V. Eley
Primary Examiner



Notice of References Cited

Application/Control No. 09/730,177		Applicant(s)/Patent Under Reexamination LEE ET AL.	
Examiner Alvin J Grant		Art Unit 3723	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,277,017	08-2001	Ji, Beom Hyun	125/15
	B	US-5,115,796	05-1992	Schweickhardt, Karl B.	125/13.01
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.